**Third United Nations International Conference on the Peaceful Uses of Atomic Energy**

A/CONF.28/A/464
SOUTH AFRICA
February 1964
Original: ENGLISH

Confidential until official release during Conference

**Abstract**

# THE PRODUCTION OF URANIUM TETRAFLUORIDE BY CALCINATION OF AMMONIUM URANOUS FLUORIDE IN A FLUIDIZED BED

by

Dr. R.E. Robinson and Mr. J.C. Geertsma
South African Atomic Energy Board, Pelindaba

and

Mr. J.C. Paynter
Government Metallurgical Laboratory, Johannesburg

A description is given of a pilot plant designed to produce approximately 100 tons of uranium tetrafluoride per annum. The plant consisted of a fluidized bed reactor in which the ammonium uranous fluoride is calcined in a stream of nitrogen, a system for the recovery of the ammonium fluoride from the effluent gases and a system for recycling the nitrogen gas.

Details are given of the design and construction of the fluidized bed reactor, materials of construction and the fluidization characteristics of the ammonium uranous fluoride. Two systems for the recovery of ammonium fluoride are described.

The first involved the condensation of ammonium bifluoride as a liquid at a carefully controlled temperature, the second makes use of a cooling chamber to condense the gas to form a solid powder.